

## BIBLIOGRAPHICAL NOTICES.

*The Naturalist on the River Amazons: a Record of Adventures, Habits of Animals, Sketches of Brazilian and Indian Life, and Aspects of Nature under the Equator, during Eleven Years of Travel.* By HENRY WALTER BATES. 2 vols. 8vo. London: John Murray, 1863.

PENNED with a homely simplicity which almost seems studied, and owing certainly no charms to what is called "word-painting," the record of Mr. Bates's long sojourn in South America is perhaps one of the most important works of its kind that has ever appeared. In these days it is somewhat of a relief to come across a book honestly written, without any attempt on the part of its author to produce a "sensation." If we were disposed to find fault with these volumes, we should say that Mr. Bates, by sinking his own individuality too much, has failed to make them as interesting as they might have been. There are few of those touches in them which show that a naturalist, after all, may be as other men are. The world gives the class credit for having eyes—albeit, as it appears in the present case from some of the illustrations, they require the aid of spectacles; but the enjoyment of other "organs, dimensions, senses, affections, passions," seems to be sometimes denied to the fraternity, as Shylock imagined it was to his kindred. Consequently this book, it must be confessed, has a certain dryness about it. Still the mellifluous phrases of a Macaulay or the glowing periods of a Gibbon do not of themselves constitute history; and, in the interests of science, there is no need to quarrel with Mr. Bates because to him has not been vouchsafed the classic grace of a Gilbert White, the poetic fancy of an Alexander Wilson, or the fiery ardour of a Charles Waterton.

The name of Mr. Bates, from his frequent and valuable contributions to our pages, must be so well known to our readers that it is unnecessary for us to say a word by way of introduction. Throughout the protracted period of voluntary exile which he has endured, he has been so unremitting in his consignment of zoological specimens to his agent in London, that there can be but few collections of importance, in any branch of the animal kingdom, which his labours have not served to enrich. Yet, knowing all this, we confess at having been utterly astonished at the tabulated results of his eleven years' wanderings. In his preface, Mr. Bates gives the following as an approximate enumeration of the total number of species which he obtained:—

"Mammals . . . . .	52
Birds . . . . .	360
Reptiles . . . . .	140
Fishes . . . . .	120
Insects . . . . .	14,000
Mollusks . . . . .	35
Zoophytes . . . . .	5

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14,712,"

adding that "no less than 8000 of the species here enumerated were *new to science*." This stupendous amount has, not unnaturally, been received with some hesitation in certain quarters; but our conviction is that Mr. Bates will prove there is no exaggeration in his estimate\*. The temper of the times is against testing the accuracy of any book by the application of simple arithmetic; but we may take the liberty of remarking that his computation amounts to the capture of more than *two new species daily* (omitting Sundays) for the eleven years of his absence—a feat, indeed, of which any man may well be proud. With respect to Insects, our author, it will be seen, deals in round numbers; and therefore to him will not apply (as it might to many another collector) the story of the American gunner, who, when boasting that he had killed ninety-nine Canvas-backed Ducks at a single "shoot," was asked by a bystander why he did not make it a clean hundred at once. "Sirree," said the Yankee, with dignity, "do you think I'd tell a lie for *one* darned duck?" We imagine, however, that we have cause for complaint against Mr. Bates that he has nowhere told us how many of these 8000 new species remain yet to be described: he speaks of the work done or doing, in the way of description, by Drs. Bowerbank, Gray, Günther, and Sclater; but how about the insects? Some, it is true, he himself has already described; but when, where, and by whom will the rest, forming (as of course they do) the bulk of the 8000, be named and distinguished? We entirely participate in the regret he expresses that "a complete set of the species has nowhere been preserved," not only for the reason he modestly assigns (a very proper one though it be), but because we conceive that, for the very honour of our country, the national collection should have become possessed of a *perfect* series of Mr. Bates's specimens, if it were merely to show foreigners what the perseverance and industry of one of her sons, not supplied from the public purse, and not equipped with state documents, in his own private capacity was able to accomplish.

Though, as we have said, Mr. Bates is no sluggard, yet he has taken the advice of the wise man, and gone to the ant to consider her ways. It seems as if the interest connected with each of the widely differing groups that in English bear that name in common were inexhaustible. Notwithstanding the mass of information respecting Termites and Ants (properly so called) to be found in books of natural history, Mr. Bates has a good deal that is new to tell us

\* In confirmation of the assertion, we may refer to two statements made by Mr. Wallace, in his 'Narrative of Travels on the Amazon, &c.'—a work to which naturalists generally have accorded all the praise bespoken for it in this Journal nearly ten years since (Annals, ser. 2. vol. xiii. p. 57). In two months that gentleman, being then in company with Mr. Bates, collected 1300 species of insects (p. 49); and at the time of his writing, he mentions that our author had then obtained 1200 species of diurnal *Lepidoptera*, 600 of which might be met with within a day's journey of Pará (p. 469)!

about them. Here is an extract from what he says of the Saüba (*Ecodoma cephalotes*):—

“The workers of this species are of three orders, and vary in size from two to seven lines..... The true working-class of a colony is formed by the small-sized order of workers, the worker-minors as they are called. The other two kinds, whose functions, as we shall see, are not yet properly understood, have enormously swollen and massive heads: in one the head is highly polished, in the other it is opaque and hairy. The worker-minors vary greatly in size, some being double the bulk of others. The entire body is of very solid consistence, and of a pale reddish-brown colour. The thorax or middle segment is armed with three pairs of sharp spines; the head also has a pair of similar spines proceeding from the cheeks behind. .... The perfect sexes are winged on their first attaining the adult state; they alone propagate their kind, flying away, previous to the act of reproduction, from the nest in which they have been reared. This winged state of the perfect males and females, and the habit of flying abroad before pairing, are very important points in the economy of ants; for they are thus enabled to intercross with members of distant colonies which swarm at the same time, and thereby increase the vigour of the race—a proceeding essential to the prosperity of any species. In many ants, especially those of tropical climates, the workers, again, are of two classes, whose structure and functions are widely different. In some species they are wonderfully unlike each other, and constitute two well-defined forms of workers. In others there is a gradation of individuals between the two extremes. The curious differences in structure and habits between these two classes form an interesting but very difficult study. It is one of the great peculiarities of the Saüba Ant to possess *three* classes of workers. My investigations regarding them were far from complete. I will relate, however, what I have observed on the subject.

“When engaged in leaf-cutting, plundering farinha, and other operations, two classes of workers are always seen. They are not, it is true, very sharply defined in structure, for individuals of intermediate grades occur. All the work, however, is done by the individuals which have small heads, whilst those which have enormously large heads, the worker-majors, are observed to be simply walking about. I could never satisfy myself as to the function of these worker-majors. They are not the soldiers or defenders of the working portion of the community, like the armed classes in the Termites or White Ants, for they never fight. The species has no sting, and does not display active resistance when interfered with. I once imagined they exercised a sort of superintendence over the others; but this function is entirely unnecessary in a community where all work with a precision and regularity resembling the subordinate parts of a piece of machinery. I came to the conclusion at last that they have no very precisely defined function. They cannot, however, be entirely useless to the community; for the sustenance of an idle class of such bulky individuals would be too heavy a charge for the species to sustain. I think they serve, in some sort, as passive

instruments of protection to the real workers. Their enormously large, hard, and indestructible heads may be of use in protecting them against the attacks of insectivorous animals. They would be, on this view, a kind of 'pièces de résistance,' serving as a foil against onslaughts made on the main body of workers" (vol. i. pp. 23-31).

This last is an ingenious suggestion of our author's, and if he had not so honestly confessed the incompleteness of his investigations, we should have been inclined to attach much weight to it; but, as the case stands, it must remain for future observers to establish its probability. We may here remark that Mr. Bates (as might be inferred from the foregoing passages) is a strenuous advocate of Mr. Darwin's views\*; indeed he states that it is owing to the encouragement given him by that gentleman that we see the work now before us. But we have here no intention of being dragged into the depths of a discussion on the derivative theory. Both opponents and promoters of that hypothesis will find much in the 'Naturalist on the Amazons' to interest them; and in future Mr. Bates's work is certain to be constantly referred to by either side.

But other Ants there are not so innocuous in their disposition. The terrible "Formiga de fogo" (*Myrmica sævissima*), "whose sting is likened by the Brazilians to the puncture of a red-hot needle," abounds on the Tapajos, a river flowing into the Amazons at Santarem. "It is found only on sandy soils in open places, and seems to thrive most in the neighbourhood of houses and weedy villages, such as Aveyros: it does not occur at all in the shades of the forest. I noticed it in moist places on the banks of the Amazons; but the species is not very common on the main river, and its presence there is scarcely noticed, because it does not attack man, and the sting is not so virulent as it is in the same species on the banks of the Tapajos. Aveyros was deserted a few years before my visit, on account of this little tormenter, and the inhabitants had only recently returned to their houses, thinking its numbers had decreased.... They seem to attack persons out of sheer malice: if we stood for a few moments in the street, even at a distance from their nests, we were sure to be overrun and severely punished; for the moment an ant touched the flesh, he secured himself with his jaws, doubled in his tail, and stung with all his might" (vol. ii. pp. 95-97). The remedy for this pleasant state of things is found in anointing the legs of chairs and foot-stools and the hammock-cords with copaiba balsam, which drug, it appears, is more than even Fire-ants can stomach, and by its application people are enabled to have a little peace.

We have not space to quote the long and extremely interesting account which Mr. Bates gives (vol. ii. pp. 350-365) of the ants of another group, the genus *Eciton*. These inhabit the densest parts of the forest, moving in vast armies. The main column, from four to six deep, marches forward, clearing the ground of all animal

\* See also the clever paper in the 'Transactions of the Linnean Society,' vol. xxiii. p. 495, the principles maintained in which, be they right or wrong, at least possess the merit of entire originality.



matter, dead or alive, throwing off here and there a thinner column to forage for a short time on the flanks of the main body, and re-enter it again after their task is accomplished. On meeting with a place rich in spoil, such as a mass of rotten wood abounding in insect larvæ, a delay takes place, and a strong force is concentrated upon it. "The excited creatures search every cranny, and tear in pieces all the large grubs they drag to light." Even wasps' nests are no impregnable fortresses to them: they escalate the low shrubs on which they are built, gnaw away the papery covering to get at the larvæ, pupæ, and newly-hatched wasps, and, regardless of the infuriated owners, cut everything to tatters. Mr. Bates says, they "never march far on a beaten path, but seem to prefer the entangled thickets, where it is seldom possible to follow them." He was not once able to find an army that had finished its day's course and returned to its hive. Indeed, he never met with a hive at all: "Wherever the *Ecitons* were seen, they were always on the march." No wonder, then, that "wherever they move, the whole animal world is set in commotion, and every creature tries to get out of their way." However, their life, even on the march, is not always spent in marauding, "fighting still and still destroying." In sunny glades, the hosts would sometimes halt, and while the columns preserved their relative position, the ranks would be broken, and the plunderers would walk slowly about, or busy themselves by attending to their toilette, brushing their own or their neighbours' antennæ. Here and there an ant was to be seen stretching forth first one leg and then another to be washed by a comrade, who performed the task by passing the limb between the jaws and the tongue, finishing by giving the antennæ a friendly wipe. "It is probable," says our author, "that these hours of relaxation and cleaning may be indispensable to the effective performance of their harder labours; but whilst looking at them, the conclusion that the ants were engaged merely in play was irresistible." Two species at least of *Eciton* are blind. These fellows are great engineers, moving wholly under covered roads, which they construct rapidly as they advance, and, protected by them, push on till they reach some happy hunting-ground in the shape of a rotting log, into the crevices of which they pour in search of booty. Their arcades extend occasionally for a distance of one or two hundred yards; but Mr. Bates does not give us as full an account of these extraordinary creatures as of their congeners who are blessed with organs of vision.

However, we have passed enough time with the ants, and must press onwards. Nearly every class of animal and vegetable life obtains a notice in Mr. Bates's book, whose pages absolutely teem with valuable information respecting beasts, birds, reptiles, and fishes, insects of all orders, and curious plants. We must not omit to draw the reader's attention to his observations on the origin and variation of species (vol. i. pp. 255-265); but, for the reason we have before given, we content ourselves here with only mentioning these much-vexed questions. In like manner, without going into the subject, we can but refer to our author's pertinent remarks on animal distribu-

tion (vol. i. pp. 108-111) in the Amazons' delta, and his judicious deductions therefrom.

Before concluding, however, we must express our satisfaction at the handy size of Mr. Bates's work. Instead of a mighty cumbersome book, we have here two volumes of small and convenient dimensions; and the first is furnished with a very excellent map, which greatly enhances the pleasure we have in following the traveller's progress on the "Mediterranean of South America." The work, too, has a liberal supply of illustrations, some of which are good, though of others we cannot say much. They are all woodcuts, and, for figures to be inserted in the text, nothing more is required; but for whole-page engravings, we think this system, so much employed in the publications of Mr. Murray, is decidedly to be reprobated. Mr. Wolf's designs are, of course, beautiful: nothing can be more animated than the drawing of the frontispiece, representing Mr. Bates "mobbed" by an angry crowd of croaking Toucans, or of the assemblage of water-birds in the foreground of the river-view in the first volume. But both are marred, and the first absolutely spoilt and rendered ridiculous, by the coarse clumsy hand of the wood-cutter, whose name, though it is perceptible in the corner of the engraving, we will mercifully withhold here\*. What, however, shall we say of the illustration representing the big Spider garotting the Finches, or rather, we suppose, the Tanagers? We should like to know whether Dr. Selater (for whose special delectation that pretty family of birds is supposed to have been developed) is aware of a species having *four anterior toes*, and these toes *equally articulated*; for such a one is here delineated by the artist, whose name, whether Brown, Jones, or Robinson, is immaterial. It is enough to say it is not Wolf.

Here, then, we must leave this interesting work. We can only tender our hearty congratulations to Mr. Bates on his safe return among us; and trusting that his four years' residence at home may have fully restored his health, so materially impaired by his unremitting toil on the Amazons, hope that in England he will not forget that virtue which carried him so successfully through all his difficulties in Brazil, but that, by still continuing the wholesome practice of "paciencia," he may be enabled thoroughly to work out all his remaining collections, and thus reap to the full the well-merited fruits of his labours.

*Iceland: its Scenes and Sagas.* By SABINE BARING-GOULD, M.A. &c. With numerous Illustrations and a Map. London: Smith & Elder, 1863.

A nephew of so distinguished an Arctic voyager as the present highly respected President of the Royal Society, it seems but natural

\* Since the above was written, we perceive that the critic of our learned cotemporary, the 'Natural History Review' (July 1863, p. 389), especially commends this frontispiece as "one of the best *executed scenes*" ever produced! Of a truth, tastes differ.